2 Species at Risk

One of the elements in developing a wildlife action plan is identifying and compiling information on species of wildlife, including low and declining populations that are indicative of the diversity and health of the state's wildlife. Fish and Game has chosen to use the **Special Animals List,** which it maintains and updates within the California Natural Diversity Database (CNDDB). This list is also referred to as the list of **species at risk** or **special status species,** and it includes vertebrates and invertebrates. The special status species are diverse, and they inhabit the varied ecosystems across the state. Many of the special status species have been identified as **species of special concern** due to their low or declining numbers.

The associated Web publication of this report includes the Wildlife Species Matrix, consisting of all wildlife species and subspecies on the California Department of Fish and Game's Special Animals List.

As described elsewhere in this report, a number of stressors are putting wildlife and habitats at risk; the greatest stressors now facing the state's natural communities and wildlife are those related to human activity. Among these, growth and development, water management conflicts, invasive species, and climate change each have major consequences for species, ecosystems, and habitats throughout the state. A number of other stressors also negatively affect species and habitats in many regions. As a result of these stressors, many wildlife and plant species are declining and are rare, or in some cases, extinct or at risk of extinction.

Plants at Risk

While the Wildlife Action Plan is focused on wildlife and its habitats, plant species are also at risk, as described here. Many of California's plant communities are threatened by rapid urban growth and development, particularly in the Sierra foothills, the Central Valley, the San Francisco Bay Area, and the South Coast Region. Examples of plant communities in the path of urban expansion include valley oak woodland, native perennial grasslands, and coastal sage scrub. Additionally, forest communities, including mixed evergreen and conifer forests, are increasingly being fragmented by rural residential development. Highly water-dependent plant communities, including riparian areas, wetlands, and vernal pools, are also at risk. These communities not only suffer from the pressure of land conversion but are also subject to changes in water availability due to water management actions, water quality issues, and excessive livestock grazing.

California has more plant species at risk (nearly 1,700 species, or 31 percent of its total flora) than any other state in the nation (Stein 2002). At least 13 of California's plant taxa are now extinct in the wild, and at least 18 other plant taxa are presumed extinct (i.e., they have not been seen for at least 20 years, although suitable habitat still exists) (CDFG 2005b). Some of these at-risk species have been listed under either state or federal endangered species acts. California hosts 186 plants federally listed as endangered, the highest number in the country after Hawaii (with 273 species). California also has 222 state-listed plants (with some of these species also occurring on the federal list) (CDFG 2005b, USFWS 2005).

Wildlife at Risk

Among wildlife species, those with limited distributions and those that are restricted to particular habitat types face formidable challenges if the habitats or resources upon which they depend are lost or degraded. Wide-ranging and migratory species also face unique threats because they are vulnerable to habitat fragmentation and because it can be difficult for conservation managers to secure the protection of widely separated habitat areas.

According to conservation status rankings developed by **Natural Heritage** programs across the United States, 23 percent of at-risk amphibian species in the United States are found in California, 29 percent of at-risk reptiles, 19 percent of at-risk birds, 41 percent of at-risk mammals, and 10 percent of at-risk freshwater fishes. In terms of overall biological diversity (including both plants and animals), California ranks second among the states for the percent of its species that are at risk (Stein et al. 2000).

More than half of California's vertebrate wildlife (a total of 455 species) are at risk and listed on the Department of Fish and Game's Special Animals List. The state also has 369 invertebrate species at risk. At least seven species or subspecies of California vertebrates and 16 total animal species are known to have become extinct in the last 150 years. Eight species of vertebrates and a number of species of invertebrates have become completely **extirpated** and four bird species no longer breed in the state (TNC 1987).

Fish and Game maintains and updates the Special Animals List in the California Natural Diversity Database (CNDDB). This list is also referred to as the list of species at risk or special status species, and it includes vertebrates and invertebrates. The special status species are diverse and inhabit the varied ecosystems across the state. Many of the special status species have been identified as species of special concern due to their low or declining numbers.

The CNDDB program has been inventorying the state's rare and declining species since 1979. The Special Animals List is updated regularly and currently contains more than 800 **taxa**. The current list is available at http://www.dfg.ca.gov/bdb/html/animals.html.

Species and subspecies are included in the Special Animals List if they fall into one or more of the following categories:

- Officially listed or proposed for listing under the state and/or federal Endangered Species Acts.
- State or federal candidate for possible listing.
- Taxa that meet the criteria for listing, even if not currently included on any list, as described in Section 15380 of the *California Environmental Quality Act Guidelines*.
- Taxa considered by Fish and Game to be a Species of Special Concern (SSC).
- Taxa that are biologically rare, very restricted in distribution, declining throughout their range, or have a critical, vulnerable stage in their life cycle that warrants monitoring.
- Populations in California that may be on the periphery of a taxon's range but are threatened with extirpation in California.
- Taxa closely associated with a habitat that is declining in California at an alarming rate (e.g., wetlands, riparian, old growth forests, desert aquatic systems, native grasslands, vernal pools.)
- Taxa designated as special status, sensitive, or declining species by other state or federal agencies or non-governmental organizations (NGOs).

The Plan development team updated information for the nearly 800 special status species statewide by conducting literature searches for each species on the Special Animals List; entering new-occurrence information from journal articles; consulting species experts for

opinions regarding the inclusion of additional rare or threatened species; and entering data from the California Natural Diversity Database backlog of field survey forms and reports. The information was then used to develop a matrix, the Wildlife Species Matrix, that includes information about those 800 species. The regional species and habitat information is described below with instructions on how to access it on the Web.

(For a description of other species and habitat databases and information available at Fish and Game, see Appendix D.)

Regional Chapters

The Species at Risk sections of the regional chapters summarize the numbers of species, endemic species, and species at risk associated with the region (DFG Special Animals List). Appendix D describes the criteria for inclusion on the Special Animals List. Details regarding the special status species, compiled in the Wildlife Species Matrix, are available on the Web at http://www.dfg.ca.gov/habitats/wdp/matrix_search.asp. The Wildlife Species Matrix lists the species at risk and provides the rarity ranking status, associated habitat, population trends, and range maps.

Each Species at Risk section also features two or three species to illustrate how various activities negatively affect species in the region. The regional chapters also discuss the major stressors affecting wildlife and habitat. Regional habitat condition is described in the context of the major stressors; e.g., degraded, altered habitat resulting from population growth and development. Habitat extent can be determined by consulting online maps provided by the California Wildlife Habitat Relationship System, described below. Finally, the regional sections present specific conservation actions to restore and conserve habitats and wildlife.

Wildlife Species Matrix

Included in the associated Web publication of this report is the Wildlife Species Matrix, consisting of all wildlife taxa (species and subspecies) on the California Department of Fish and Game's Special Animals List. This special status species list includes 140 birds, 127 mammals, 102 fishes, 43 reptiles, 40 amphibians, and 365 invertebrates. Of these, 13 birds, 69 mammals, 19 reptiles, 22 amphibians, 46 fish, and 312 invertebrates are endemic to the state; these taxa are indicated in the matrix with an asterisk. The matrix can be sorted by taxa names and by region. For each taxon, the matrix gives the following information:

Rarity Ranking Status—the CNDDB status column combines **NatureServe's** Global Ranking, which indicates a taxon's relative rarity globally (G), with the state rarity ranking (S), which is assigned by Fish and Game:

G/S5: Secure; common and widespread

G/S4: Apparently secure; uncommon but not rare

G/S3: Vulnerable; at moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors

G/S2: Imperiled: at high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors

G/S1: Critically imperiled: at very high risk of extinction due to extreme rarity (often five or fewer populations), very steep declines, or other factors

G/SH: Possibly extinct

G/SX: Presumed extinct

Descriptions of other ranking systems included in the Wildlife Species Matrix are included in the introduction to Fish and Game's Special Animals List, available online at http://www.dfg.ca.gov/bdb/pdfs/SPAnimals.pdf.

Habitat association—A descriptive habitat association is given, which is based on the Wildlife and Habitat Relationship Database's list of 60 habitat types found within the state. When too little habitat information is available, the association is marked as "Insufficient data for habitat determination"; when a large number of habitats is used, the phrase "Wide variety of habitats" appears. Habitat associations were determined by using ArcMap to query the California Wildlife Habitat Relationship Database by individual habitat types for taxa occurrences in the California Natural Diversity Database.

Population trends—By definition, rare species are infrequently encountered. For certain well-studied, regularly surveyed groups such as birds and fishes, population trends are available from various sources and have been noted in the matrix as declining, stable, or increasing. For many taxa in the matrix, particularly invertebrates and small mammals, lack of data precludes meaningful population trend estimates; for these, the trend is listed as unknown.

Range maps—The current range of a species within California (where available) can be viewed by using the range map access button. These range maps appear at a statewide

scale, unless the species' limited distribution merits a different scale. The range maps were developed using one of two different protocols. The more recent maps were created after development of a standardized mapping approach that considers current data and scale and incorporates a peer review process. They are designed to produce an accurate and standardized depiction of a species' range in California. More information on how current maps were created and the process that will be employed to revise the older California Wildlife Habitat Relationship (CWHR) maps is available on the Web at http://www.dfg.ca.gov/bdb/index.html. Advantages of a standardized approach that incorporates current occurrence data and a peer review process are: 1) using standardized features supports the underlying assumption that these range polygons can be used as data for spatial analysis; 2) the process of map preparation follows the scientific principles of repeatability and the use of fully described methods; and 3) they can be used as a baseline against which future range trends can be measured. Some older maps were created for the CWHR project in the late 1980s and are based solely on professional judgment. These maps were hand-drawn on letter-sized paper without the benefit of supporting data. They were not intended as a rigorous or precise definition of a species range in California and were created in support of a wildlife-habitat relationship modeling system. Until revised, these maps represent the best available range information for these species.

Current species-level range maps for fish were produced by the University of California, Davis, Information Center for the Environment, in conjunction with Dr. Peter Moyle and his graduate student Paul Randall as part of the Hexagon Project conducted by The Nature Conservancy in 1998. Digital data from 10 different fish databases and GIS layers containing California hydrology and California state boundaries were projected on paper maps (roughly 11 inches by 17 inches). Polygons were then hand-drawn on these paper maps and digitized using ARC/INFO GIS software. The resulting polygons are accurate at a scale of roughly 1:1,000,000. For more information about this project or to see additional maps produced, please visit http://ice.ucdavis.edu/aquadiv/fishcovs/fishmaps.html.